AMPHIBIAN FOOTPRINTS FROM THE MISSISSIPPIAN OF VIRGINIA

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In the summer of 1908 a geological field party from Oberlin College collected a series of amphibian footprints from the Mississippian of Giles County, Virginia. The horizon of the prints was near the bottom of the Hinton formation, but as the line of demarkation between the Hinton and the underlying Bluefield formation is not sharply drawn it was impossible to determine the exact distance above that contact. The Bluefield in this region is about 1,300 feet thick according to Campbell, and the Hinton about the same thickness. The horizon of the tracks is about 1,300 feet above the Greenbrier limestone which lies just below the Bluefield, and 1,300 or 1,400 feet below the equivalent of the Pottsville. According to Stevenson the Bluefield and Hinton are to be correlated with the upper part of the Mauch Chunk of Pennsylvania, and it was from the Mauch Chunk of Pennsylvania 700 feet below the Pottsville conglomerate that *Sauropus primevus* Lea was collected.

The Hinton shales, like the Mauch Chunk, seem to have been subaerial in origin and are made up for the most part of variegated shales interbedded with thin layers of argillaceous, fine-grained sandstone. The footprints occur in fine-grained sandstone, and remains of land plants are not uncommon in the same beds. No marine fossils were noted by the writer in his examination of the Hinton excepting in one horizon, and that probably represented a brief transgression of the sea over delta flats. The fossils were rare and belong to only four or five species.

Twenty-two footprints made by one animal walking in a straight course were collected in a slab. They give the impression of having been made by a bipedal animal for part of the distance, but after the fourth print of the right foot impressions of the forefeet appear. The distance from tip of toe to tip of toe in the first prints is about

21 cm., but with the appearance of the prints of the forefeet the distance apart is 165 mm., 40 mm., 85 mm., 70 mm., 80 mm., 40 mm., 150 mm., and then back to 20 and 21 cm., with no more prints of the forefeet. Where only the prints of the hindfeet appear the impressions are deeper.

The hindfeet were 60 mm. in length, and 20 to 25 mm. in breadth. They had five digits, the middle digit being the longest and the two inside of it being only slightly shorter and lying close together. Their outer ends were slender and flexible and usually curved inward toward the middle toe. The two outer digits formed wide angles with the middle one and were shorter than the inner ones. The second toe was webbed to within 8 mm. of the tip, the third toe to within 23 mm. of the tip. The impression of the web is well preserved in only one impression of the hindfoot. The heel was narrow, 10 to 12 mm. in length, and not well enough distinguished in the prints to determine its exact shape.

FIG. 1.—*Dromopus aduncus* $\frac{1}{5}$ natural size.

The forefeet were 45 mm. in length and had four digits. The three inner digits were subequal in length, the two inner being more flexible and incurved near the ends. The outer digit is two-thirds as long as the second. The webbing extends about half the length of the digits. The heel impression is broader than that of the hindfoot.

The distance between the inner parts of the impressions of the right

and left feet is 35 mm. and between the outer parts 90 mm. No impression of a tail is present.

The photograph reproduced in Fig. 1 is of that part of the slab showing only impressions of the hindfeet, but opposite the posterior impression a fragment from farther forward containing a track of the left forefoot is inserted. All of the feet have the heel impression shown rather indistinctly. The photograph shows the impressions of the hindfeet just behind the place where impressions of the forefeet appear.

It hardly seems worth while to attempt to classify the specimen under discussion but such an attempt may lead to a better understanding of its relationships. Using Matthew's classification it should be referred to the genus *Dromopus*, and the specific name *aduncus* is suggested, referring to the inward bending of the outer ends of the inner toes.

Amphibian footprints have been recorded from the Mississippian of America as follows:

Paleosauropus primevus Lea from the Mauch Chunk near Pottsville, Pennsylvania, about 700 feet from the top of the formation (*Proceedings of the American Philosophical Society*, IV [1849], 91–94, one figure).

Three unnamed varieties from about 2,200 feet from the top of the Mauch Chunk of Pennsylvania (Rogers, *Geology of Pennsylvania*, Part II [1856], 831).

Hylopus hardingi Dawson and *Hylopus logani* Dawson from the Subcarboniferous of Nova Scotia (*Transactions of the Royal Society of Canada*, XII, sec. iv [1894], 78).

One form from "not far from the horizon of Sauropus primaevus" in Pennsylvania (J. Barrell, *Bulletin of the Geological Society of America*, XVIII [1907], 460).